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Fabrication of modified porous starch for the removal of vanadate from aqueous solutions

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ABSTRACT

The dithiocarbamate-modified porous starch (DTCPS) was synthesized. It is a cheap sorbent with super adsorption ability for V(V) ions removal from aqueous solutions. Surface structure of DTCPS was confirmed by using SEM, Fourier transform infrared spectra and TGA. The DTCPS has many micropores, which favours the adsorption of V(V) ions. Adsorption results indicate that mechanism is predominately based on electrostatic attraction. The adsorption of V(V) ions on DTCPS was largely dependent on the pH value, and the optimal pH was 3.0. In such solution, the decavanadate $V_{10}O_{26}(OH)_2^{4-}$ and $V_{10}O_{27}(OH)^{5-}$ are main species. They adsorbed to DTCPS following the pseudo-second-order equation and Langmuir isotherm.

Keywords: Modified porous starch; Synthesis; Characterization; Vanadate; Adsorption

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